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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/767,490

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Motomi Matsunaga

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27123

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11/16/2005

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EXAMINER

PRITCHETT, JOSHUA L

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/767,490

Applicant(s)

MATSUNAGA ET AL.

Examiner

Joshua L. Pritchett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-27 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This action is in response to Amendment filed September 27, 2005. Claims 18, 20, 22 and 24 have been amended as requested by the applicant.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-6, 13-17 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Takeyama (US 2002/0039232).

Regarding claim 1, Takeyama discloses an optical system comprising a plurality of optical surfaces (3 and 4₁-4₅) including a first surface (4₄ and 4₁) on which light rays from an object (5) are incident (Fig. 1) and which has at least a reflective action (Fig. 1), and a second surface (4₂) reflecting the light rays reflected by the first surface back toward the first surface (Fig. 1); wherein the first surface reflects a central field angle principal ray (2), which comes from the second surface and is again incident on the first surface, to the opposite side of the

previous reflection with respect to a normal at a hit point of the central field-angle principal ray on the first surface (Fig. 1); and wherein the plurality of optical surfaces includes a diffractive optical surface (3; Fig. 1). Surfaces 4₁ and 4₄ are considered to be a single surface because they appear to be a part of the same continuous curve.

Regarding claim 2, Takeyama discloses the first surface is decentered with respect to the light rays from the object (Fig. 1).

Regarding claim 4, Takeyama discloses the first surface and the second surface are formed on a transparent member filled with an optical medium (Fig. 1; para. 0126).

Regarding claim 5, Takeyama discloses the diffractive optical surface is one of the plurality of optical surfaces other than the first and the second surface (Fig. 1).

Regarding claim 6, Takeyama discloses the first and the second surfaces are formed on a first transparent member filled with an optical medium (Fig. 1) and wherein the diffractive optical surface, which is not the first or second surface, is formed on a second transparent member filled with an optical medium (Fig. 1). Fig. 1 shows that diffractive element (3) has depth and that the reflection and diffraction occurs at the back surface of the medium.

Regarding claim 13, Takeyama discloses the diffractive optical surface has a reflection action (para. 0127; Fig. 1).

Regarding claim 14, Takeyama discloses the diffractive optical surface has a transmissive action (para. 0127; Fig. 1).

Regarding claim 15, Takeyama discloses the light rays from the object form an intermediate image inside the optical system (para. 0067).

Regarding claim 16, Takeyama discloses the diffractive optical surface is arranged between the object and the intermediate image (Fig. 1). The intermediate image occurs at the convergence of the light beams shown prior to the diffractive surface in the optical path.

Regarding claim 17, Takeyama discloses the diffractive optical surface is provided at a position, which is closer to a pupil image-forming position of the light rays from the object than to the object (Fig. 1).

Regarding claim 26, Takeyama discloses an image-forming device (5) forming an original image and an optical system guiding light from the original image to a viewer's eye or to a projection surface (para. 0034).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeyama (US 2002/0039232) in view of Yamazaki (US 6,687,057).

Regarding claim 3, Takeyama teaches the invention as claimed but lacks reference to the diffractive surface being the second surface. Yamazaki teaches the diffractive surface being the

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second surface in a prism (col. 5 lines 24-29). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the Takeyama invention include the diffractive surface on the second surface as taught by Yamazaki for the purpose of reducing the number of optical elements present in the optical path.

Regarding claims 7-12, Takeyama teaches the invention as claimed but lacks reference to the symmetry of the diffractive surface. Yamazaki teaches the use of both rotationally symmetric (col. 10 lines 10-12) and asymmetric (col. 7 lines 50-51) diffractive surface. Yamazaki further teaches the use of both symmetric and asymmetric phase distribution (abstract). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the Takeyama diffractive surface to have the symmetry of Yamazaki for the purpose of minimizing aberrations during diffraction.

Claims 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeyama (US 2002/0039232) in view of Takagi (US 2003/0107816).

Regarding claims 18 and 22, Takeyama teaches the invention as claimed including a third surface (4₃) but lacks reference to the claimed optical path. Takagi teaches the use of an optical system with a first (31b), second (31c) and third (31a) surface. Takagi further teaches the light transmitting through the third surface, reflecting off the first surface, reflecting off the second surface, reflecting off the first surface, reflecting off the third surface and transmitting through the first surface (Fig. 2). In another embodiment Takagi teaches a first (D), second (C) and third (B) surface and the light transmitting through the third surface, reflecting off the first surface, reflecting off the second surface, reflecting off the first surface, reflecting off

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the second surface, reflecting off the first surface, reflecting off the third surface and transmitting through the first surface (Fig. 16). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Takeyama reference have the optical path of Takagi for the purpose of reducing the light intensity to a desired level while minimizing the aberrations in the image.

Regarding claims 19, 21, 23 and 25, Takeyama teaches the invention as claimed but lacks reference to the angle of reflection. Takagi further teaches the angle formed on reflection at the second surface being less than 60-degrees (para. 0089). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Takeyama reference have the optical path of Takagi for the purpose of reducing the light intensity to a desired level while minimizing the aberrations in the image.

Regarding claims 20 and 24, Takeyama teaches the invention as claimed but lacks reference to the claimed optical path. Takai teaches a first (31b), second (32c) and third (31a) surface and transmission through the first and third surfaces and reflection at the first, second and third surfaces (Fig. 2). The claims do not require that the events listed in the claim limitations happen in any certain order. The prior art teaches that the claimed events occur and therefore meet the claim limitations. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Takeyama reference have the optical path of Takagi for the purpose of reducing the light intensity to a desired level while minimizing the aberrations in the image.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeyama (US 2002/0039232) in view of Sekita (US 5,917,662).

Takeyama teaches the invention as claimed but lacks reference to a photoelectric conversion device. Sekita teaches the use of a photoelectric conversion device (col. 7 lines 34-36) in an optical system forming an object image on a light-receiving surface of the photoelectric conversion device (Fig. 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Takeyama optical device used in a photoelectrical conversion device as taught by Sekita for the purpose of recording an object image.

Response to Arguments

Applicant's arguments, see Amendment, filed September 27, 2005, with respect to the drawings have been fully considered and are persuasive. The objection of the drawings has been withdrawn.

Applicant's arguments filed September 27, 2005 have been fully considered but they are not persuasive.

Applicant argues that surfaces 4₁ and 4₄ of the Takeyama are not part of the same surface. The surfaces of Takeyama can be considered as the same surface because the whole of the exterior of the prism is a surface and the labels provided by Takeyama are merely groupings of the different curvatures of the exterior surface of the prism. Applicant argues that the surfaces have different radii of curvature and therefore cannot be considered to be the same surface. In

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the current application Fig. 1 labels surface C as a single surface that clearly has more than one radius of curvature. The examiner therefore holds that one can consider a portion of the exterior surface of the prism to be a single surface subset even if it has more than one radius of curvature.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L. Pritchett whose telephone number is 571-272-2318. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLP 


DREW A. DUNN
SUPERVISORY PATENT EXAMINER